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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/601,301 | 06/13/2003 | Seiji Sarayama | 2271/62289-Z | 5867 |

7590 09/01/2005

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EXAMINER

HO, TU TU V

| ART UNIT | PAPER NUMBER |
|----------|--------------|
|----------|--------------|

2818

DATE MAILED: 09/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/601,301

Applicant(s)

SARAYAMA ET AL.

Examiner

Tu-Tu Ho

Art Unit

2818

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 August 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 87-93 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 87-93 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☒ Certified copies of the priority documents have been received in Application No. 09/590,063.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 08/22/2005 has been entered.

Claim Rejections § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 87-93 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 87 recites:

“a bulk crystal substrate of GaN comprising:

a slab of GaN single crystal having a substantially uniform composition of GaN in a thickness direction of said slab, said GaN single crystal slab being produced by a process comprising the steps of:

forming a molten flux of a volatile metal element in a pressurized reaction vessel confining therein said molten flux together with an atmosphere containing N (nitrogen), such that said molten flux includes Ga in addition to said volatile metal element;

growing GaN in the form of a single crystal body in said molten flux; and

supplying a compound containing N into said reaction vessel from a source located outside said reaction vessel.”

The claim, in short, is directed to a *product-by-process* single-crystal GaN substrate having a substantially uniform composition of GaN in a thickness direction of said slab. As such, the process steps are only evaluated to determine the final properties and characteristics of the product (MPEP 2113 [R-1]). In the instant case, it is not clear how the claimed process steps contribute to the “substantially uniform composition of GaN in a thickness direction” property of the slab, specially that “substantially uniform composition” has not been clearly defined in the specification.

Specifically, as an example, DiSalvo - a prior art of record, cited in the parent application - discloses a slab of GaN single crystal produced by the step of:

forming a molten flux of a volatile metal element (sodium metal, column 4, lines 20-35) in a pressurized reaction vessel confining therein said molten flux together with an atmosphere containing N (nitrogen), such that said molten flux includes Ga in addition to said volatile metal element;

growing GaN in the form of a single crystal body in said molten flux; and
supplying a compound containing N into said reaction vessel from a source located outside said reaction vessel (column 4, lines 31-52, particularly: “The autoclave was sealed, inserted into a furnace, and attached to a nitrogen line”).

Would it be appropriate to conclude that the DiSalvo’s process steps, which are the same as the claimed process steps, produce a product the same as that as claimed? Namely, would it be appropriate to conclude that the DiSalvo’s process steps, which are the same as the claimed process steps, produce a slab of GaN single crystal having a substantially uniform composition of GaN in a thickness direction of said slab?

Claims 88-92 depend from rejected claim 87 and include all limitations of claim 87 thereby rendering these claims indefinite.

Conclusion

3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tu-Tu Ho whose telephone number is (571) 272-1778. The examiner can normally be reached on 6:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, DAVID NELMS can be reached on (571) 272-1787. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Tu-Tu Ho
August 30, 2005